University of Kerala

Discipline	CHEMISTRY				
Course Code	**UK4VACCHE201**				
Course Title	**SCIENTIFIC COMMUNICATION AND ETHICS**				
Type of Course	**VAC**				
Semester	4				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	3	3 hours	-	-	3
Pre-requisites	1. Basic knowledge and interest in science				
Course Summary	The course covers scientific communication methods, data bases, intellectual property rights, ethics for publication and metrices for journal.				

Detailed Syllabus:

Module	Unit	Content	Hrs
	SCIENTIFIC COMMUNICATION AND ETHICS		**45**
I	**METHOD OF SCIENTIFIC COMMUNICATION**		**6**
	1	Need for science communication - Importance and use of science communication	1
	2	Public Understanding of Science (PUS) - Science popularization: programmes, organizations, individuals - Method of science - Scientific temper	2
	3	Sources of scientific information – books, scientific reports, scientific journals, magazines, feature syndicates, leaflets, tabloids, wall magazines, speeches, seminars, press releases, databases, encyclopaedias on science, etc	2
	4	Comparative study of science sections and supplements carried in Indian / foreign newspapers and science magazines.	1
II	**SCIENTIFIC DIGITAL DATA BASE**		**9**
	5	Web resources, E-journals, Journal access, TOC alerts, Hot articles, Citation index, Impact factor, Metrics: h-index, g-index, i10 index, altmetrics. E-consortium, UGC infonet, E-books, Internet discussion groups and communities, Blogs, Preprint servers.	3
	6	Search engines, Scirus, Google Scholar, ChemIndustry, Wiki-Databases, ChemSpider, Science Direct, SciFinder, Scopus.	3

	7	Information Technology and Library Resources: The Internet and World Wide Web. Internet resources for chemistry. Finding and citing published information.	3
III	**INTELLECTUAL PROPERTY RIGHTS & ETHICS IN PUBLICATIONS**		**15**
	8	Concepts and Evolution: Introduction to Intellectual Property Rights,	1
	9	Evolution of Intellectual Property Laws. Standards and Concepts in Intellectual Property,	2
	10	Law of Intellectual Property and Ethical Issues, Knowledge Driven Economy and IPR	2
	11	Intellectual Property Rights in India and abroad. Law of Patents.	2
	12	Publication ethics: definition, introduction and importance,	2
	13	Best practices/ standards setting initiatives and guidelines: COPE, WAME, etc.	3
	14	Conflicts of interest, Copy right, royalty, Plagiarism, citation, acknowledgement, reproducibility and accountability.	3
IV	**METHODS OF SCIENTIFIC RESEARCH AND WRITING SCIENTIFIC PAPERS:**		**6**
	15	Reporting practical and project work. Writing literature surveys and reviews. Organizing a poster display. Giving an oral presentation.	3
	16	Writing scientific papers – justification for scientific contributions, bibliography, description of methods, conclusions, the need for illustration, style, publications of scientific work. Writing ethics. Avoiding plagiarism.	3
V	**OPEN ENDED MODULE:**		**9**
	17	Seminar presentations, group discussions, debates, quizzes, case studies etc on the above modules - discussion on ethical considerations in scientific research and publishing - designing experiments or surveys - collecting and analysing data - writing up the findings in a scientific paper - case studies on the violation of intellectual property rights etc. **(Or any other related activities introduced by the teacher)**	9

REFERENCES

1. Jane Gregory and Steve Miller, *Science in Public: Communication, Culture, and Credibility, Plenum,* New York, 1998.
2. James G, Paradis and Muriel L. Zimmerman, *The MIT Guide to Science and Engineering Communication.* MIT Press, UK, 2002.
3. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. *An introduction to Research Methodology,* RBSA Publishers Bird, A. (2006). Philosophy of Science. Routledge.
4. MacIntyre, Alasdair (1967) *A Short History of Ethics.* London.
5. P. Chaddah (2018) *Ethics in Competitive Research: Do not get scooped; do not get plagiarized,* ISBN: 978-9387480865.

6. Resnik, D.B. (2011). *What is ethics in research and why is it important.* National Institute of Environmental Health Science, 1-10.
7. *Practicing communication ethics.* Boston, MA: Allyn & Bacon.
8. Hibbert, D. B. & Gooding, J. J. (2006) *Data analysis for chemistry.* Oxford University Press.
9. Dawson, C. (2002). *Practical research methods.* UBS Publishers, New Delhi.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	To apply the principles of scientific communication and ethical practice to analyse science content in print and digital media, prepare concise and accurate science-based materials to promote scientific temper, public understanding of science, and meaningful comparison of science coverage in Indian and international publications.	Ap	PSO-1,2,3
CO-2	To analyse various scientific information sources, chemistry-specific search engines and databases, evaluate their reliability, relevance, and ethical use for locating, interpreting, and citing published chemical literature.	An	PSO-1,2,3
CO- 3	To evaluate ethical practices and regulatory frameworks in scientific communication in maintaining integrity in scientific research and dissemination.	E	PSO-1,2,3
CO- 4	To independently design and produce original scientific outputs by formulating justified scientific arguments, applying appropriate styles of documentation, integrating ethical writing practices, and ensuring academic integrity through the avoidance of plagiarism.	C	PSO-1,2,3,4
CO- 5	To design and present original scientific outputs through various activities, demonstrating ethical decision-making in scientific research and publishing, responsible data handling, and informed analysis of issues such as intellectual property rights violations.	C	PSO-1,2,3,4

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: SCIENTIFIC COMMUNICATION AND ETHICS

Credits: 3:0:0 (Lecture:Tutorial:Practical)

CO No.	CO	PO/ PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	CO-1	PO-1,8 PSO-1,2,3	Ap	F, C	L	-
2	CO-2	PO-1,2,8 PSO-1,2,3	An	P	L	-
3	CO- 3	PO-1,8 PSO-1,2,3	E	F, C	L	-
4	CO- 4	PO-1,8 PSO-1,2,3,4	C	C, P	L	-
5	CO- 5	PO-1,8 PSO-1,2,3,4	C	C, P	L	-

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs:

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	3	2	3	-	-	1	-	-	-	-	-	-	3
CO 2	3	3	3	-	-	2	2	-	-	-	-	-	3
CO 3	2	2	3	-	-	2	-	-	-	-	-	-	3
CO 4	2	2	2	2	-	1	-	-	-	-	-	-	3
CO 5	2	2	3	2	-	2	-	-	-	-	-	-	3

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam

- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics:

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓	✓		